Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

FreedomCAR

CHANGE FOR THE BETTER WITH ENERGY STAR

U.S. Department of Energy
Energy Efficiency and Renewable Energy

A Strong Energy Portfolio for a Strong America

Spencer Abraham, Secretary of Energy

David Garman, Assistant Secretary, Energy Efficiency and Renewable Energy

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. By investing in technology breakthroughs today, our nation can look forward to a more resilient economy and secure future.

To Our Readers,

If you think about it, the clearest way to define national security is being prepared for the unexpected.

In light of the oil crises, reliability concerns, price volatility, and changes in environmental policies over the last three decades, one thing we know for certain about energy markets is that they can throw us quite a curve—and that we need to be prepared.

The President's National Energy Policy lays out a plan to prepare America for greater energy independence. Of the 105 components of the policy, 54—more than half—pertain to the importance of increasing energy efficiency or expanding our use of renewable energy.

The Office of Energy Efficiency and Renewable Energy (EERE) leads the charge for far-reaching technological change, to conserve and diversify the energy sources used to fuel America, and to lay the foundation for independence from imported oil. We pursue a diverse portfolio of research, development, and demonstration, all with one ultimate aim: to bring you a prosperous future where energy is abundant, reliable, and affordable.

Sincerely,

Spencer Abraham
and
David Garman

Far-reaching technology changes will be essential to America's energy future. Working with a wide array of partners, the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) invests in a portfolio of energy technologies that will:

- *Enhance our energy security, reducing our vulnerability to supply uncertainties brought about by emergencies such as storms, floods, or even future terrorist attacks on America's energy infrastructure.*
- *Increase our economic security, promoting industrial productivity, and ensuring reliable electricity and abundant, affordable energy to power economic growth.*
- *Improve our environmental security, reducing the emissions related to energy production and use, and conserving our natural environment.*

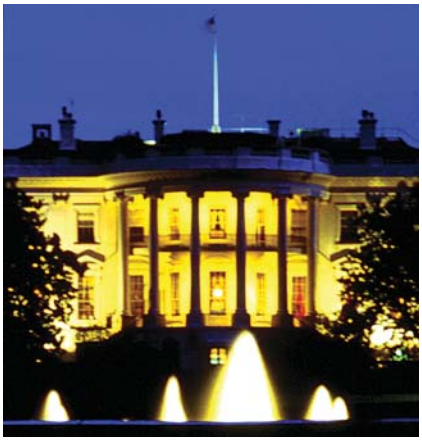
The EERE portfolio includes technologies that will **dramatically reduce energy demand** in the residential, commercial, industrial, government, and transportation sectors; **increase and diversify energy supply**, with a focus on renewable domestic sources; upgrade the reliability of our national **energy infrastructure**; facilitate the emergence of **hydrogen technologies** as a vital part of our energy future; and **reduce our reliance on imported oil**.

Making wise and productive use of energy

Conserving energy is a key part of the EERE equation. EERE's extensive research programs include efforts to improve the energy efficiency of vehicles, appliances, and buildings. The goal: to provide consumers with high levels of performance with less

As the nation's largest single energy user, the federal government is committed to using energy wisely in its own facilities and fleets throughout the country. Thanks to the efforts of the Federal Energy Management Program, government facilities are helping to lead the way in adopting energy-efficient and renewable technologies, and are on track to reduce energy use by 35 percent in 2010, compared to 1985. Achieving this goal will save taxpayers more than $750 million per year.

consumption of electricity, petroleum, and natural gas. Similarly, in the area of industrial technologies, EERE partners with manufacturers to improve yields, save energy, and improve environmental performance. Energy efficiency not only returns bottom-line cost savings, but also makes wise use of our nation's valuable energy resources and enhances environmental protection.



EERE develops energy-efficiency product standards and, with the Environmental Protection Agency, encourages consumer purchase of ENERGY STAR® products that exceed these standards. Together with state and community partners, EERE also provides a wide array of educational and technical assistance to help individuals, businesses, industries, schools, and local governments put energy-efficiency technologies and practices to work.

Americans enjoy the value provided by Energy Star® products, which are promoted in a joint effort by DOE and the Environmental Protection Agency. Innovations by manufacturers mean that today's most efficient washing machines use less than half the water and two-thirds the energy of five-year-old machines, while doing a better job on laundry. From refrigerators and computers, to light bulbs and air conditioners, Energy Star® products provide energy-efficient choices for consumers.

Bringing renewable energy sources on line

Energy efficiency alone will not fill the gap between future energy demand and supply. Fortunately, America is blessed with a tremendous renewable resource base that can contribute substantially to our energy needs, especially for electricity generation. The challenge is to harness these resources in a cost-effective, competitive manner.

Our nation's investments to date are beginning to pay off, bringing several renewable energy sources within striking distance of cost-competitiveness with conventional sources. With continued R&D by government and the private sector, we will see a wealth of renewable energy supplies entering the market-place over the next 20 years, from wind, biomass, geothermal, and solar technologies. We will also keep our abundant hydropower resources on line, through environmentally friendly technologies.

Ensuring reliable delivery of energy

Ensuring the reliable delivery of high-quality electricity is increasingly important in our digital economy. Yet many components of our nation's electricity infrastructure are aging and in need of replacement. That's why EERE is conducting research to improve the reliability and performance of the transmission system, through such technologies as high-temperature superconducting cable, advanced management tools, and technologies to create a smart, reliable electricity grid.

Distributed generation—using small units to generate electricity at the site where it is consumed—is another part of the solution. Ultimately, many of our nation's buildings could generate their own power from distributed and renewable resources, and our factories will become energy parks that produce energy as well as use it.

Distributed electricity generation will make our energy infrastructure more reliable and less vulnerable to disruption, and reduce the need for new power plants to meet peak demand. The EERE portfolio includes research on microturbines, reciprocating engines, fuel cells, combined heat and power systems, energy storage devices, and communications and controls systems, as well as many renewable technologies that may be well suited to distributed applications.

Courtesy Cargill Dow

▲ *Cutting-edge technologies for producing power, liquid fuels, and products from biomass can turn American farms and forests into tremendous resources to meet future energy needs and lessen our nation's dependence on foreign oil. EERE focuses its biomass R&D on cellulosic ethanol, gasification, and the integrated biorefinery concept for economically producing biobased products.*

Transitioning to a hydrogen economy

Our nation currently depends on petroleum—56 percent of which is imported—to fulfill virtually all our transportation energy needs. Oil imports add about $109 billion per year to our nation's balance of payments deficit.

EERE is working on several fronts to reduce our dependence on imported oil: by developing technologies that may double or even triple the fuel efficiency of current vehicles; by bringing down the cost of alternative fuels, including ethanol and biodiesel; by developing technologies to improve the competitiveness and fuel economy of hybrid vehicles; by partnering with the trucking industry on prototype heavy-duty vehicles with improved fuel efficiency; and by promoting tax incentives to get more efficient cars and light trucks on the road as soon as possible.

The most far-reaching effort of all is FreedomCAR—a cooperative research initiative that teams DaimlerChrysler, Ford, and General Motors with industrial suppliers, national laboratories, and universities. FreedomCAR targets a dramatic long-term goal: the development of emissions-free and petroleum-free

vehicles. The effort focuses on the long-term, high-risk research needed to develop safe, affordable, and dependable hydrogen fuel cells to power our vehicles and the hydrogen production, storage, and distribution infrastructure to support them. President Bush has announced a Hydrogen Fuel Initiative, a new national commitment to move hydrogen fuel cell cars from the laboratory to the showroom.

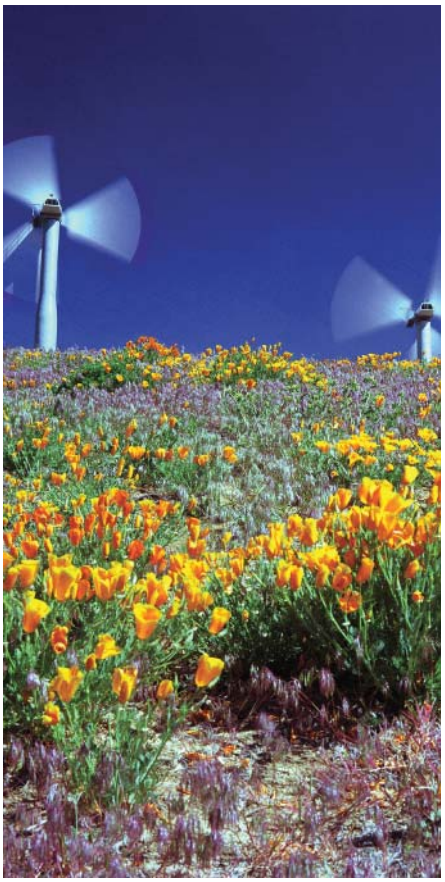
Hydrogen and fuel cell technologies ultimately can lead to vehicles requiring no foreign oil and emitting nothing more than water vapor—all without sacrificing performance or freedom of choice. Hydrogen and fuel cell systems, a top priority of President Bush; can play multiple roles in our energy future, not only powering our vehicles, but also providing electricity and thermal energy for factories, office buildings, and, ultimately, residences.

Industrial productivity improvements also hold promise for decreasing our dependence on foreign oil. Reducing energy consumption in this fuel-flexible sector of our economy makes more natural gas available to displace oil in other applications.

Renewable energy within reach

Public and private R&D partnerships have made renewable energy technologies dramatically more cost effective than they were just two decades ago. With sustained R&D, our nation will have a range of economical, reliable renewable options for meeting tomorrow's energy needs.

- ***Wind:*** *R&D investments to date have lowered the cost of wind energy from about 80 cents per kilowatt-hour in current dollars in 1980 to as little as 4 cents per kilowatt-hour today. By 2010, EERE targets a cost of 3 cents per kilowatt-hour in those regions of the country with competitive wind resources. EERE also focuses R&D on low wind speed turbines designed to make wind energy more economically attractive in areas of the nation closer to population and load centers.*
- ***Biomass:*** *R&D has reduced the price of power from gasified biomass residues from 20 cents per kilowatt-hour in 1980 to a range of 7 to 10 cents per kilowatt-hour today. With sustained R&D efforts, EERE believes that a cost of 4 to 6 cents per kilowatt-hour is within reach by 2010.*
- ***Geothermal:*** *R&D has reduced the cost of power from new geothermal plants from about 15 cents per kilowatt-hour in 1985 to a range of 5 to 8 cents per kilowatt-hour today.*
- ***Solar:*** *The first commercially available PV panels in the early 1980s produced power at a cost of about $2 per kilowatt-hour. Today, these systems can deliver electricity for as low as 20 to 38 cents per kilowatt-hour. Through further R&D advances, EERE's goal for 2020 is to reduce this cost to 5 cents per kilowatt-hour to the end customer. One focus of solar research will be the achievement of cost-effective "Zero Net Energy Buildings," or buildings that produce on average as much energy as they use.*



Making a Real Difference in Our Nation's Energy Choices

Technological improvements are only as valuable as the benefits they actually provide. That's why EERE focuses not only on research and development, but on demonstrating and applying clean energy technologies in ways that can make a real difference in our everyday lives as Americans.

Through six DOE regional offices, EERE actively supports communities, businesses, and individuals in deploying energy-efficiency and renewable energy technologies and practices, matching client needs with a variety of DOE resources and programs. EERE also works closely with states through the State Energy Program, providing grants for clean energy technologies.

A wide array of EERE programs provide "hands-on" assistance to communities and businesses. **Rebuild America** creates a national network of public-private partnerships engaged in improving energy efficiency in commercial, school, and multifamily buildings. Local action plans reduce energy costs, with savings used to modernize buildings and revitalize communities. **Energy Smart Schools**, a part of Rebuild America, focuses on helping K-12 schools lower their energy costs and create better learning environments. **Clean Cities** partnerships promote increased use of alternative-fuel vehicles through approximately 80 local coalitions around the country.

The **Weatherization Assistance Program** works with state agencies and local service providers to weatherize homes of low-income Americans. **ENERGY STAR®** teams with manufacturers and retailers to provide consumers with more energy-efficient choices in appliances, furnaces, air conditioners, lights, windows, and other products.

Effective partnerships—such as Rebuild America and it's Energy Smart Schools campaign— are vital to meeting our nation's energy challenges. EERE's partners include , companies, universities, research organizations, and other Federal agencies, as well as Congress. EERE's field office in Golden, Colorado, develops and manages many of these important activities.

In its first 25 years, the Weatherization Program has weatherized the homes of over five million low-income American families. Weatherization permanently reduces energy bills of client families—by an average of $300 per year—and also enhances property values, brings dollars into the local economy, improves the tax base, generates jobs, and develops job skills. Combining both energy and non-energy benefits, the Weatherization Program produces $3.71 in returns for clients and communities for every dollar invested. The benefits are so significant that the President has committed $1.4 billion over the coming decade to continue making low-income family homes more affordable and comfortable.

Together, these EERE activities support the widespread deployment and use of clean energy technologies, helping our communities, families, industries, and businesses make a real difference—in our nation's energy choices, and in our everyday lives.

EERE research focuses on solutions to revitalize America's energy future

Biomass

Building Technologies

Distributed Energy & Electric Reliability

Federal Energy Management

FreedomCAR & Vehicle Technologies

Geothermal

Hydrogen, Fuel Cells, & Infrastructure Technologies

Industrial Technologies

Solar

Weatherization & Intergovernmental

Wind & Hydropower

For More Information

DOE's six regional offices serve as our front line, delivering energy-efficient and renewable energy technologies to states, communities, and businesses. Contact the regional office in your area for more information.

Central Regional Office
303-275-4826
www.eere.energy.gov/regions/central

Mid-Atlantic Regional Office
215-656-6950
www.eere.energy.gov/regions/mid-atlantic

Midwest Regional Office
312-353-6749
www.eere.energy.gov/regions/midwest

Northeast Regional Office
617-565-9700
www.eere.energy.gov/regions/northeast

Southeast Regional Office
404-562-0555
www.eere.energy.gov/regions/southeast

Western Regional Office
206-553-1004
www.eere.energy.gov/regions/western

For more information about DOE's Office of Energy Efficiency and Renewable Energy programs, call 1-877-EERE-INF or visit ***www.eere.energy.gov***

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